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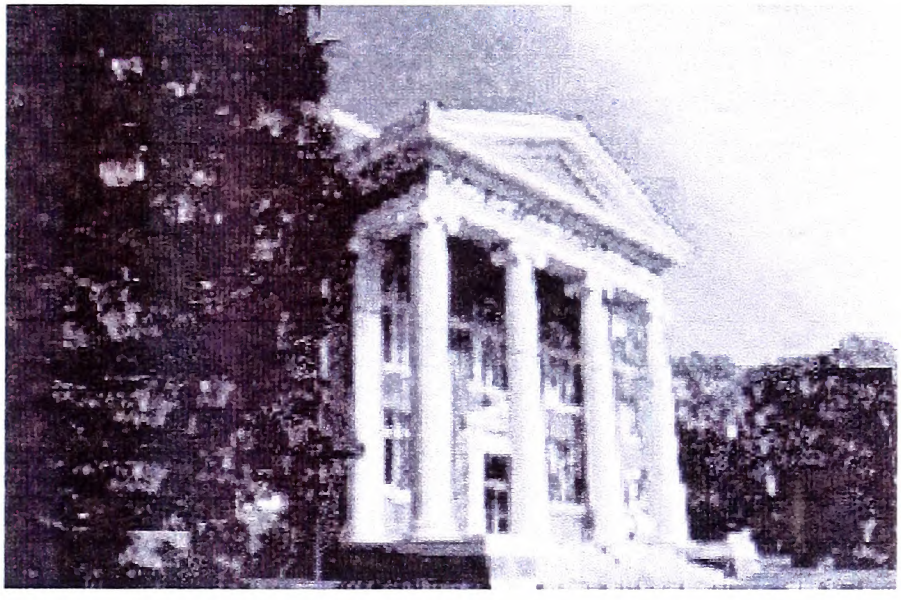
North Carolina Department of Transportation
Office of Planning & Environment
Statewide Planning Branch

Thoroughfare Plan Study Report for



Washington County, North Carolina

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THOROUGHFARE PLAN STUDY REPORT FOR WASHINGTON COUNTY

Prepared by:
Statewide Planning Branch
North Carolina Department of Transportation

In Cooperation with:
Washington County
Federal Highway Administration
U.S. Department of Transportation

October 2001

ACKNOWLEDGEMENTS

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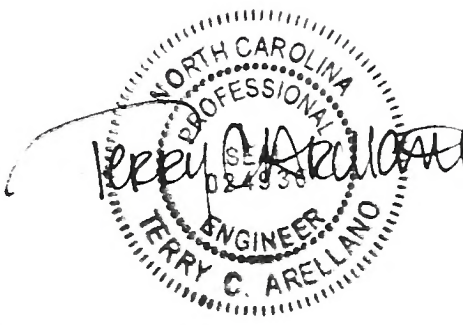

Executive Summary

In December 1997, Washington County requested thoroughfare planning assistance from the Statewide Planning Branch. The resulting plan, the first ever for Washington County, is presented in **Figure 2**. The 2000 Thoroughfare Plan for Washington County is a map that will serve as a mutually adopted official guide for transportation in the area that emphasizes providing a well coordinated, efficient and economically feasible major street system. This plan will provide local officials and staff information concerning future roadway improvements that can be implemented in planning and policy decisions.

This report documents the findings of this study, along with the resulting recommendations for improvements. In addition, this report presents thoroughfare cross-section recommendations and plan implementation recommendations.

After several informational meetings with the Planning Board, County Commissioners, and County citizens, the Commissioners adopted the Washington County Thoroughfare Plan after a public hearing held on March 5, 2001.

Initiative for plan implementation rests largely with the policy boards and citizens of Washington County. Highway needs throughout the State exceed the available funding; therefore, local areas should aggressively pursue funding for the projects they desire.

It is important to realize that the recommended Thoroughfare Plan is based upon anticipated growth and development of the County reflecting currently observed trends. Prior to the construction of specific projects, a more detailed study will be required to reconsider development trends and determine specific design requirements.

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I. Introduction

A carefully planned transportation system plays an imperative role in our economy and our way of life. This system will provide a means of transporting people and goods from one place to another quickly, conveniently, and safely. A carefully planned system will meet the existing travel demands, as well as keep pace with the growth of the region. Recognizing the importance of planning for future transportation needs, Washington County requested thoroughfare planning assistance from the Statewide Planning Branch of the North Carolina Department of Transportation (NCDOT).

Washington County is located in the northeastern portion of the State, bordered to the north by the Roanoke River, to the east by Tyrrell County, to the south by Hyde and Beaufort Counties, and to the west by Martin County. The geographical location of Washington County is shown in **Figure 1**.

This report documents the development of the 2000 Washington County Thoroughfare Plan shown in **Figure 2**. The plan includes all portions of the County, with the exception of the Plymouth planning area.[1] In addition, this report presents thoroughfare cross-section recommendations and plan implementation recommendations. A thoroughfare plan is developed to ensure that the transportation system will be progressively developed, meeting the needs of the County. The thoroughfare plan will serve as an official guide to providing a well coordinated, efficient, and economical major street system. It will be utilized by local officials to ensure that planned transportation facilities will reflect the needs of the public, while minimizing disruption to local residents, businesses, and the environment.

The purpose of this study was to examine present and future transportation needs of Washington County and develop a thoroughfare plan. The proposed system of thoroughfares was developed following the basic principles of county thoroughfare planning as described in **Chapter VII** of this report. The plan recommends those improvements that are necessary to provide an efficient transportation system within the 2000-2025 planning period. The recommended cross-sections for these improvements are based on existing conditions and projected traffic volumes, and are outlined in **Appendix A**.

The proposed thoroughfare plan is based on the anticipated growth and development as coordinated with the County. It is possible that actual growth patterns will differ from those logically anticipated. As a result, it may be necessary to accelerate or delay the development of some thoroughfares found on the plan. Likewise, some portions of the thoroughfare plan may require revisions in order to accommodate unexpected changes in urban development.

[1] The Town of Plymouth has worked cooperatively with the Statewide Planning Branch to develop a thoroughfare plan for its own planning area. This plan was mutually adopted September 11, 2000. The Plymouth Planning area is delineated on the Washington County Thoroughfare Plan map.

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GEOGRAPHIC LOCATION
FOR
WASHINGTON COUNTY

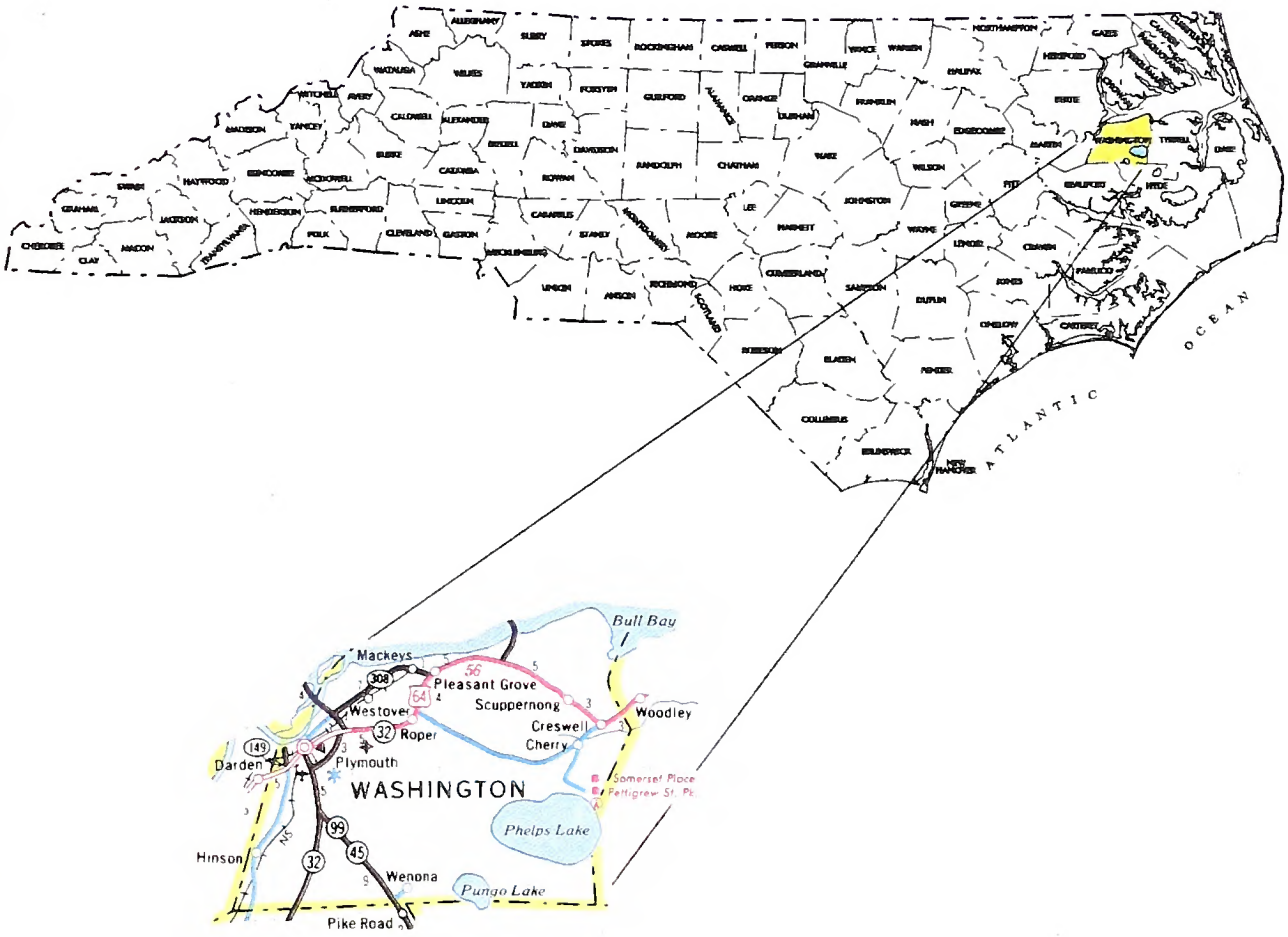

FIGURE 1

LEGEND

	EXISTING	PROPOSED
INTERSTATE		
OTHER PRINCIPLE ARTERIAL		
MINOR ARTERIAL		
MAJOR COLLECTOR		
MINOR COLLECTOR		
URBAN MAJOR THOROUGHFARE		
INTERCHANGE		
URBAN PLANNING AREA		

ADOPTED BY:

WASHINGTON COUNTY	MARCH 5, 2001
Recommended by STATEWIDE PLANNING BRANCH	AUGUST 1, 2001
NC DEPARTMENT OF TRANSPORTATION	SEPTEMBER 6, 2001

FIGURE 2

NOVEMBER 16, 2000

RECOMMENDED THOROUGHFARE PLAN FOR WASHINGTON COUNTY NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

0 1 2 3 4 5
Scale in Miles

II. Thoroughfare Plan for Washington County

Intent of the Thoroughfare Plan

Transportation is a major factor affecting a region's economic vitality. Without an adequate transportation system, people cannot easily reach their intended destination, goods cannot be delivered in a cost effective manner, and developers may look to invest in better served regions. Recent trends such as "just-in-time" delivery, increased automobile ownership, and increased migration away from central cities and towns are exhausting existing transportation systems and requiring that more emphasis be placed on planning now for future development.

A thoroughfare plan study identifies existing and future deficiencies in a transportation system, and examines the need for improvements and/or new facilities. A thoroughfare plan also outlines the transportation network according to the functional use of each roadway within the system, based upon the Federal Functional Classification System.

Recommended Thoroughfare Plan

The recommended thoroughfare plan for Washington County, which is presented in **Figure 2**, presents a system of roadways that will serve the anticipated traffic and land development needs for Washington County. The roadways comprising this plan are stratified into the four functional classifications: principal arterials, minor arterials, collector roads, and local roads.

Principal Arterials are rural links in the highway system. These facilities typically serve statewide or interstate travel. The principal arterial system serves all urban travel areas having populations greater than 50,000 and most areas having populations greater than 5,000. Generally, interstates constitute a significant portion of these roadways; however, there are no interstate routes in Washington County. The proposed US 64 Bypass (TIP Project R-2542) is an example of a principal arterial traversing Washington County.

Minor Arterials are rural roadways that join cities, larger towns, and other major traffic generators. This system provides intra-state and inter-county travel at relatively high travel speeds with minimum interference to through traffic. Upon completion of the Proposed US 64 Bypass, existing US 64 will function as a minor arterial for Washington County.

Collector Roads generally serve intracounty travel. This classification is further divided into **major** and **minor collectors**. ***Major collectors*** are rural routes that serve travel within a county, particularly for those larger towns that are not served by principal or minor arterials. Major collectors provide access to other traffic generators such as consolidated schools, shipping points, county parks, etc. This system also provides these types of places access to routes of higher classification and serve more important intra-county travel corridors. NC 32-45, from Plymouth

planning area to Beaufort County line, is an example of a major collector designated on the Washington County thoroughfare plan.

Minor collectors are roads that collect traffic from local roads and bring all developed areas within a reasonable distance of a major roadway facility. These roadways provide service to the remaining smaller communities and link local traffic generators with the major collectors. Front Street (SR 1301), from NC 308 to US 64, is an example of a minor collector in Washington County.

Local roads are roadways that are not classified on one of the previous higher systems. These roads consist of residential subdivision streets and residential collector streets. Local residential streets do not connect to thoroughfares or serve major traffic generators and typically do not collect traffic from more than 100 dwelling units. Residential collectors connect local residential streets with the thoroughfare system.

Recommended Improvements

The process of determining and evaluating recommendations for those roads comprising the thoroughfare plan involves many considerations, including the goals and objectives of the area, existing roadway properties, identified roadway deficiencies, environmental impacts, and existing and anticipated land development. Consideration of these factors led to the cooperative development of two recommended improvements, which are indicated by the dashed lines in **Figure 2.** The purpose and need for these recommendations are given below.

Proposed US 64 Bypass (TIP Project R-2542)

This planned facility will traverse Washington County east-west. This project calls for the construction of a multi-lane, fully access-controlled roadway tying into existing US 64 at NC 45 east of the Town of Plymouth. The new roadway will begin just east of NC 45 and the Elementary School on existing US 64. The existing roadway will be widened to a five-lane curb and gutter section for approximately 800 feet. At this point, the new location roadway will begin transitioning from the five-lane section to a four-lane divided shoulder roadway. The new roadway will serve as the "through movement" and approximately 150 feet of the existing roadway surface will be removed. Existing US 64 will tie-in to the Proposed Bypass via a new two-lane facility. Interchanges are proposed as part of this project at the intersections of the Bypass with E. Mill Pond Road (SR 1125), the proposed NC 32 Connector (TIP Project R-3620), Mile Wretch Road (SR 1304)/Cedar Wretch Road (SR 1411), and Sixth Street (SR 1310). Traffic volumes are projected to range from 11,600 to 15,300 vehicles per day (vpd) by the year 2025. The Environmental Impact Statement completed October 1999 by the Project Development & Environmental Analysis (PDEA) Branch documents the purpose and need for these improvements. Contact information for PDEA is included in **Appendix B**.

Proposed NC 32 Connector (TIP Project R-3620)

- **Summary of Need:** TIP Project R-2548 will shift US 64 south of its existing alignment, thereby limiting movement within Washington County and other portions of northeastern North Carolina. A new facility is needed to provide a

direct link from the new US 64 roadway to NC 32 and other roads within the transportation system.

- **Summary of Purpose:** The primary purpose of the proposed project is to extend NC 32, providing a connection between the existing county roadway system and US 64 once relocated in order to facilitate travel both within and through Washington County.

- **Roadway Conditions:** NC 32 is designated as a major rural collector in the North Carolina statewide functional classification system. NC 32 exists north of US 64 as a two-lane roadway, approximately 24 feet in width with soil shoulders. The posted speed limit along this portion of NC 32 is 55 mph.

  The estimated 1999 average daily traffic (ADT) along existing NC 32 ranges from 3,700 to 4,400 vehicles per day (vpd). The capacity of the existing roadway is approximately 12,000 vpd, which is sufficient for the existing travel demand.

  Growth in the area is expected to increase slightly through the year 2025, resulting in increases in employment, personal and business trips within and through the area. An estimate of 2025 traffic based on expected growth trends reflects that 11,200 vpd will utilize existing NC 32 in the future.

- **System Linkages:** The proposed project will provide a needed link to the existing roadway network. Currently, a connection between US 64 and NC 32 exists. However, the relocation of US 64 resulting from the construction of TIP Project R-2548 will sever this connection. US 64 and NC 32 currently provide a means of north-south movement through the county. Furthermore, NC 32 provides access to US 64 for travelers coming in from neighboring Beaufort, Hyde and Chowan Counties wishing to travel to the east or west.

- **Transportation Plans:** This proposed corridor is included as an element of the recently adopted Thoroughfare Plan for Washington County. Public opinion during the development of this plan expressed the need for a continued connection between US 64 and NC 32. In addition, this project has been included in the NCDOT Transportation Improvement Program as an identified future need, a feasibility study or a programmed project since 1996.

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III. IMPLEMENTATION

Implementation is a critical aspect of the transportation planning process. If the recommendations of the plan are not actively pursued, the effort and expense associated with the development of the plan are wasted. Neglect of the implementation process is a three-fold loss: the loss of the capital expenditures used to develop the plan; the opportunity cost of the capital expenditures; and the loss of the benefits which would accrue from an improved transportation system. Several administration controls and implementation tools exist to aid the implementation of the Thoroughfare Plan. These are as follows:

State and County Adoption of the Thoroughfare Plan

Mutual adoption of the Thoroughfare Plan by Washington County and the N.C. Department of Transportation is the first step towards implementation. Once mutually adopted, the Thoroughfare Plan may serve as a guide for the Department of Transportation in the development of the road and highway system for the County. Local approval of the plan enables the County to use standard road regulations and land use controls, as outlined below, to effectively implement this plan.

Subdivision Regulations

Subdivision regulations require all developers to submit to the County Planning Commission a plan for any proposed subdivisions. These regulations also require that subdivisions be constructed to certain minimum standards. Through this process, it is possible to reserve or protect the necessary right-of-way for streets that are a part of the thoroughfare plan and to require subdivision streets to conform to the plan. The construction of subdivision streets to adequate standards will reduce maintenance costs and facilitate the transfer of the streets to the State Highway System. **Appendix C** outlines the recommended subdivision design standards as they pertain to road construction.

Land Use Controls

Land use regulations are an important tool in that they control future land development and minimize undesirable development along roads and highways. The land use regulatory system can improve roadway safety by requiring sufficient setbacks to provide for adequate sight distances and by requiring off-street parking.

Development Reviews

Driveway access to a State-maintained street or highway is reviewed by the District Engineer's office and by the Traffic Engineering & Safety Systems Branch of the North Carolina Department of Transportation prior to access being permitted. Any development expected to generate large volumes of traffic may be comprehensively studied by staff from the Traffic Engineering & Safety Systems, Statewide Planning, and Roadway Design Branches of NCDOT. If completed at an early stage, the development's accessibility may be significantly improved at minimal expense while

maintaining the integrity of the Thoroughfare Plan. Contact information for the Traffic Engineering & Safety Systems Branch is included in **Appendix B**.

Funding Sources

The final step of the implementation process is funding the various projects derived from the Thoroughfare Plan. The County has several funding options when pursuing the construction of recommended improvements, including the following:

- **Transportation Improvement Program** - North Carolina's Transportation Improvement Program (TIP) is a document which lists all major construction projects planned by the NCDOT for the next seven years. In addition to highway construction and widening, TIP funds are available for bridge replacement projects, highway safety projects, public transit projects, railroad projects, and bicycle projects. Similar to local Capital Improvement Program Projects, TIP Projects are matched with projected funding sources. With each biennial update of the TIP, completed projects are removed, programmed projects are advanced, and new projects are added. Local areas have the opportunity to request projects during public hearings held during the TIP development process.

- **Industrial Access Funds** – If an industry wishes to develop property that does not have access to a state maintained roadway and certain economic conditions are met, the funds may be available for construction of an access road. Inquiries regarding these funds should be directed to the NCDOT Secondary Roads Office.

- **Small Urban Funds** - Small Urban Funds are annual discretionary funds distributed to municipalities with qualifying projects, with a maximum $300,000 awarded per project per year. Requests for Small Urban Fund assistance should be directed to the appropriate Board of Transportation Member and Division Engineer.

- **Secondary Roads Program** - Nearly all secondary road improvements are completed on a county by county basis. Secondary roads funds are used to pave unimproved roads, widen narrow roadways, stabilize dirt roads, improve minor alignment flaws, and construct short connectors when appropriate.

- **North Carolina Highway Trust Fund** - The Highway Trust Fund, established in 1989, outlines four major goals for the State's roads and highways as follows:

    - To complete the remaining 1,700 miles of four-lane construction on the 3,600 mile North Carolina Intrastate System;
    - To construct a multilane connector in Asheville and portions of multilane loops in Charlotte, Durham, Greensboro, Raleigh, Wilmington, and Winston-Salem;
    - To supplement the secondary roads appropriation in order to pave all unpaved secondary roads by 2006; and
    - To supplement the Powell Bill Program.

IV. Population, Land Use, and Economy

In order to fulfill the objectives of an adequate twenty-five year thoroughfare plan, forecasts of future travel patterns must be achieved. Such forecasts depend on analysis of the following items: historic and potential population and employment changes; significant economic trends; character and intensity of land development; and the ability of the existing transportation system to meet existing and future travel demand. Secondary items that influence forecasts include the effects of legal controls such as zoning ordinances and subdivision regulations, availability of public utilities and transportation facilities, and topographic and other physical features of the urban area.

Population

Since the volume of traffic on a roadway is related to the size and distribution of the population that it serves, population data is used to aid the development of the thoroughfare plan. Future population estimates typically rely on the observance of past population trends and counts. While statistics show that the population within Washington County has been decreasing since the late 1970's, local officials feel that population will increase over the planning period due to recent and planned developmental trends. Over the next ten years, County officials expect to see slight growth, with the County population increasing to approximately 15,000 persons. However, this population will be of a lower economic base and skill level. There has been and will continue to be greater disparity throughout the County, based upon the Department of Social Services caseload. **Table 1** presents the population trends for the State, the County, and municipalities and townships in Washington County.

Land Use

Land use refers to the physical patterns of activities and functions within an area. The traffic of a particular road is related to the land uses adjacent to that facility. For example, a shopping center generates larger traffic volumes than a residential area. The attraction between different land uses and their association with travel varies with the size, type, intensity, and spatial separation of each land use. When dealing with transportation planning, land use is divided into the following classifications:

- **Residential** - All land is devoted to the housing of people, with the exception of hotels and motels;

- **Commercial** - All land is devoted to retail trade including consumer and business services and their offices; this may be further stratified into retail and special retail classifications. Special retail would include high-traffic establishments, such as fast-food restaurants and service stations; all other commercial establishments would be considered retail;

- **Industrial** - All land is devoted to the manufacturing, storage, warehousing, and transportation of products;

- **Public** - All land is devoted to social, religious, educational, cultural, and political activities; this would include the office and service employment establishments.

Washington County consists of all four types of land use. Commercial development is predominant along the US 64 corridor and within town limits. The majority of the remaining land use within the county limits is residential and industrial.

The anticipated land use development for the planning area is predominantly residential, industrial, and commercial. Currently, the County Commissioners are mainly seeking out industrial development. The Town of Plymouth is the driving force behind tourism development throughout the County. Expected development will lead to an increase in the commercial industry, particularly lodging, food and gas establishments. Industrial and commercial growth is expected to continue along the US 64 corridor throughout the County. In addition, many new subdivisions are planned for construction along the Roanoke Sound.

Economic Trends

The economic base of an area is an important factor to consider when estimating future travel patterns and growth. The economic base is indicative of the employment type and size, which, in turn, influences an area's population. Data obtained from the Employment Security Commission show that there were approximately 5,500 employees in Washington County in 2000 with an unemployment rate of 6.5%. Based on a population of about 13,700, the employment-to-population ratio for the County is 0.40. This ratio is slightly low due to incommuters from neighboring counties. According to County officials, the economic development of the region is fairly steady and is projected to remain so for the next several years.

Vehicle Registration

Growth in vehicle registration tends to mirror growth in traffic volumes. As the number of vehicles increases, a greater strain is placed on the existing road network. Additional traffic volumes will result in additional safety hazards and congestion. To alleviate traffic congestion, steps must be taken towards constructing new roads, enhancing existing facilities, and providing for travel via other transportation modes.

In the past, vehicle registrations have increased at a greater rate than population. This increase is best understood with the analysis of the persons per registered vehicle ratio over time. This ratio, which is obtained by dividing the total county population by the total vehicles registered in the county, is summarized for past years in **Table 2**. These results illustrate the transition from a non-automobile oriented society to a heavily auto-dependent society over time. This means that more vehicle trips are being produced, and, as a result, traffic and congestion on the street system are growing at a faster rate than population.

Table 1. Washington County Population Trends and Projections
(Data provided by the NC Office of State Budget, Planning and Management)

Location	1960	1970	1980	1990	2000	Avg. Growth Trends	2010	2020	2025	Growth Trends
North Carolina	4,556,155	5,084,411	5,880,095	6,628,637	8,049,313	1.43%	9,468,787	10,895,220	11,751,860	1.53%
Washington County	13,490	14,040	14,800	14,000	13,723	0.04%	13,299	12,823	12,607	-0.34%
Townships										
- Lees Mill	3440	3410	3590	2935	NA	-0.52%	NA	NA	NA	NA
- Plymouth	6950	7510	7790	7710	NA	0.35%	NA	NA	NA	NA
- Scuppernong	2240	1730	1540	1480	NA	-1.37%	NA	NA	NA	NA
- Skinnersville	1200	1390	1880	1870	NA	1.50%	NA	NA	NA	NA
Towns										
- Creswell	425	635	425	360	278	-1.01%	NA	NA	NA	NA
- Plymouth	4490	4775	4570	4330	4107	-0.22%	NA	NA	NA	NA
- Roper	795	795	650	670	613	-0.64%	NA	NA	NA	NA

Table 2. Persons per Registered Vehicle for Washington County
(Data provided by the NC Office of State Budget, Planning and Management)

Year	Registered Vehicles	Population	Persons/Reg. Vehicle
1970	6,098	14,038	2.30
1975	8,292	15,100	1.82
1980	9,221	14,801	1.61
1985	9,244	14,285	1.55
1990	9,882	13,997	1.42
1995	10,308	13,756	1.33
1997	12,035	13,297	1.10

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V. Travel Deficiency Analysis of Existing System

An important stage in the development of a thoroughfare plan is the analysis of the existing roadway system and its ability to serve the area's travel desires. Emphasis is placed not only on detecting the existing deficiencies, but also on understanding the causes of these deficiencies. Travel deficiencies may be localized, resulting from problems with roadway design or intersection geometry. Travel deficiencies may also result from system problems, such as the need to construct missing travel links, bypass routes, loop facilities, or additional radial routes.

An analysis of the roadway system looks at both current and future travel patterns and identifies existing and anticipated deficiencies. This is usually accomplished through a traffic collision analysis, roadway capacity deficiency analysis, and system deficiency analysis.

Traffic Collision Analysis

Traffic collisions or "crashes" are often used as an indicator for locating congestion problems. While often the result of drivers or vehicle performance, crashes may also be a result of the physical characteristics of the roadway. Roadway conditions and obstructions, traffic conditions, and weather may all lead to a crash. While some crashes are the fault of the driver, others may be prevented with physical design changes or traffic control changes such as the installation of stop signs or traffic signals.

Crash data for the period from January 1995 to December 1997 was studied as part of the development of this report. The collision analysis considered both collision frequency and severity. Crash frequency is the total number of reported collisions, while crash severity is the crash rate based upon injuries and property damage incurred. These two factors helped to determine the worst intersections within the County which are summarized in **Table 3.**

Table 3. Intersections of Concern Within the Planning Area*

Map Index	Intersection	Average Severity	Total Collisions
1	US 64 at NC 45	<10.00	6
2	US 64 at Hortonton Road (SR 1330)	22.08	5
3	US 64 at Old Creswell Road (SR 1158)	<10.00	4
4	US 64 at Davenport Road (SR 1303)	<10.00	3
5	US 64 at 6th Street in Creswell (SR 1310)	76.80	3

*Collisions compiled for the January 1995 – December 1997 period, based upon those intersections having 3 or more reported accidents.

In addition to these locations, coordination with County staff identified the intersection of Mackey's Road/NC 308 at US 64 as a location of local concern. Numerous collisions have occurred at this location over the past several years, due mainly to the high volume of truck traffic along US 64.

The NCDOT Division is actively involved with investigating and improving many of these locations. To request a more detailed analysis for any of the locations listed in **Table 3**, or other intersections of concern, the County should contact the Division Traffic Engineer. Contact information for the Division Traffic Engineer is included in **Appendix B**.

Roadway Capacity Deficiencies

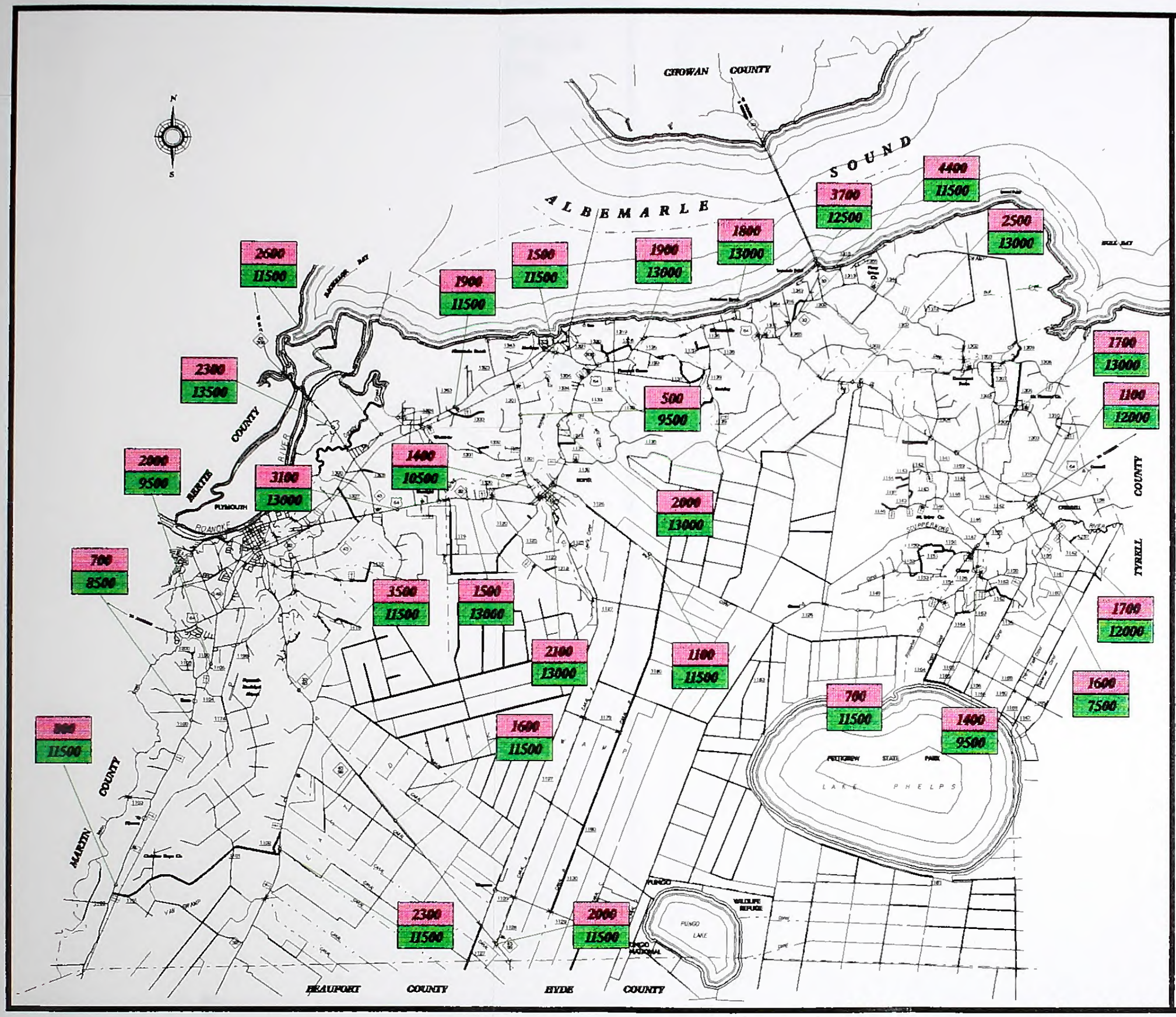
Roadway capacity deficiencies occur wherever the travel demand volume of a roadway is close to or more than the capacity of that roadway. Travel demand volume is the total number of vehicles that wish to use a roadway on a daily basis. The existing travel demand volumes for the planning area are based upon traffic count data taken annually by the NCDOT Traffic Surveys Unit and are shown in **Figure 3** for the year 1999. The projected 2025 travel demand volumes, which are based upon historic and anticipated population, economic growth patterns, and land use trends, are shown in **Figure 4**.

Capacity is the maximum number of vehicles that can pass over a given section of roadway during a given time period under prevailing roadway and traffic conditions while still maintaining a service level that is acceptable to drivers. Many factors contribute to the capacity of a roadway, including:

- Geometry of the road, including number of lanes, horizontal and vertical alignment, and proximity of perceived obstructions to safe travel along the road;
- Typical users of the road, such as commuters, recreational travelers, and truck traffic;
- Access control, including streets and driveways, or lack thereof, along the roadway;
- Development along the road, including residential, commercial, and industrial developments;
- Number of traffic signals along the route;
- Peaking characteristics of the traffic on the road;
- Characteristics of side-roads feeding into the road; and
- Directional split of traffic or the percentages of vehicles traveling in each direction along a road at any given time.

The relationship of travel demand volume to roadway capacity determines the level-of-service (LOS) of a roadway. Six distinct levels-of-service are possible, with letter designations ranging from LOS A, which represents the best operating conditions, to LOS F, which represents the worst operating conditions. LOS D indicates "practical capacity" of a roadway, or the capacity at which the public begins to express dissatisfaction. The six levels of service are illustrated in **Figure 5**.

Design requirements for thoroughfares vary according to the desired capacity and level-of-service. Recommended improvements and overall design of the Thoroughfare Plan were based upon achieving a minimum LOS D on existing facilities and a LOS C on new facilities.



BASE YEAR TRAVEL AND ROADWAY CAPACITIES (1999)

Legend

Average Daily Traffic (Vehicles/Day) — XXXX

Roadway Practical Capacity (Vehicles/Day) — XXXX

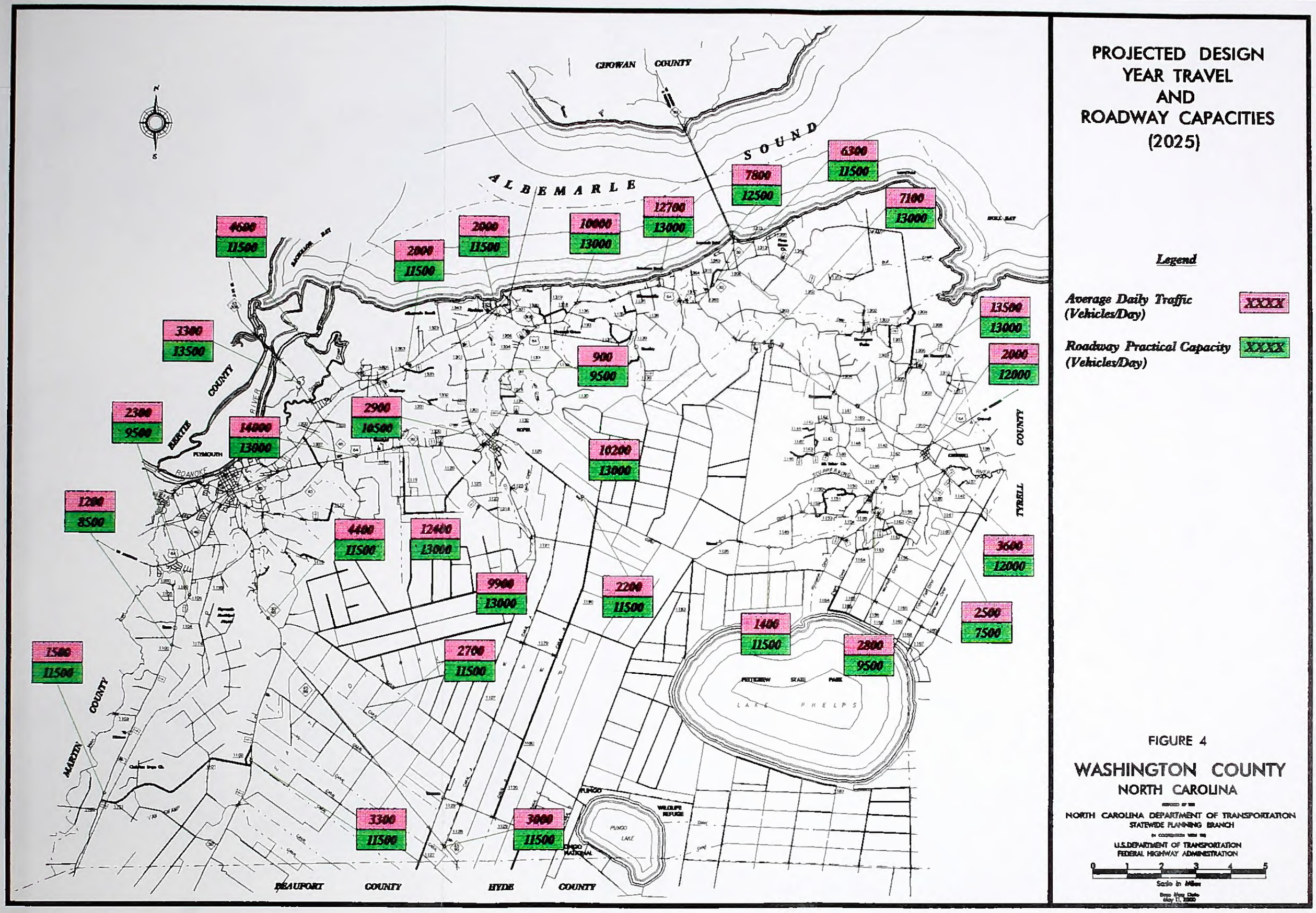
FIGURE 3

WASHINGTON COUNTY
NORTH CAROLINA

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

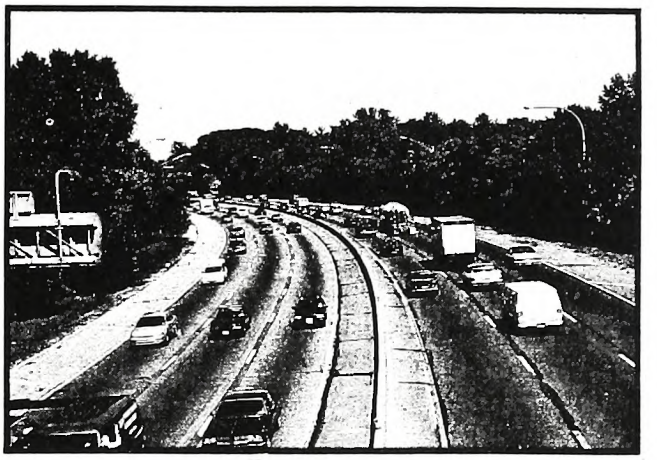
0 1 2 3 4 5
Scale in Miles



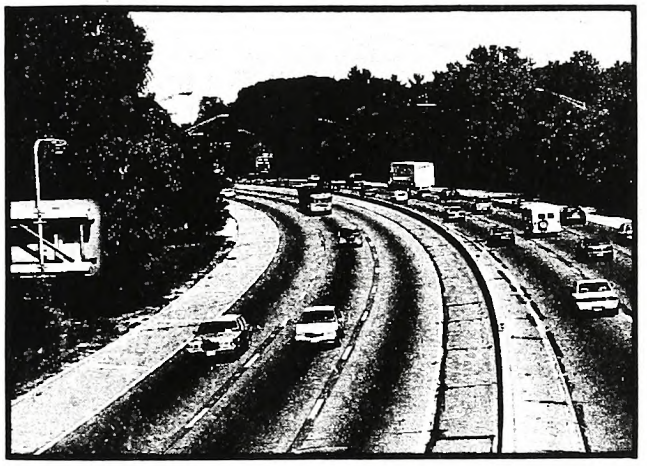
PROJECTED DESIGN
YEAR TRAVEL
AND
ROADWAY CAPACITIES
(2025)
Legend
Average Daily Traffic (Vehicles/Day) XXXX
Roadway Practical Capacity (Vehicles/Day) XXXX
FIGURE 4
WASHINGTON COUNTY
NORTH CAROLINA
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STATEWIDE PLANNING BRANCH
U.S.DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
0 1 2 3 4 5
Scale in Miles
CHOWAN COUNTY
ALBEMARLE SOUND
BERTIE COUNTY
MARTIN COUNTY
TYRELL COUNTY
BEAUFORT COUNTY
HYDE COUNTY
PLYMOUTH
ROANOKE
RIVER
LAKE PHELPS
PETTIGREW STATE PARK
PUNGO LAKE
PUNGO
WILDLIFE REFUGE
6300 11500
7800 12500
7100 13000
12700 13000
10000 13000
2000 11500
2000 11500
4600 11500
3300 13500
900 9500
13500 13000
2000 12000
2300 9500
14000 13000
2900 10500
10200 13000
1200 8500
4400 11500
12400 13000
3600 12000
9900 13000
2200 11500
2500 7500
1400 11500
2800 9500
1500 11500
2700 11500
3300 11500
3000 11500

Source: 1994 Highway Capacity Manual

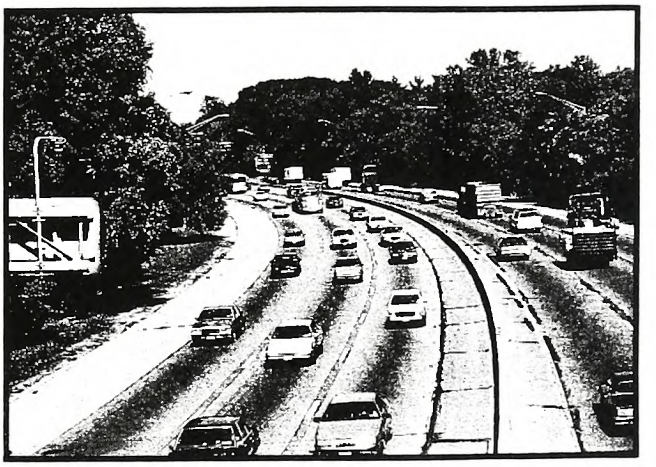
LOS A.



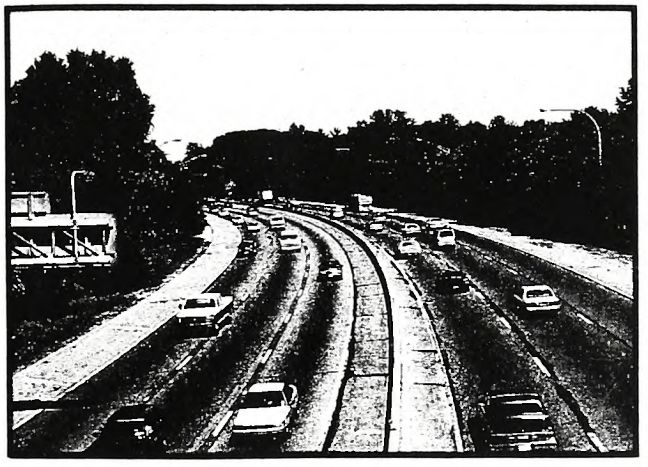
LOS D.



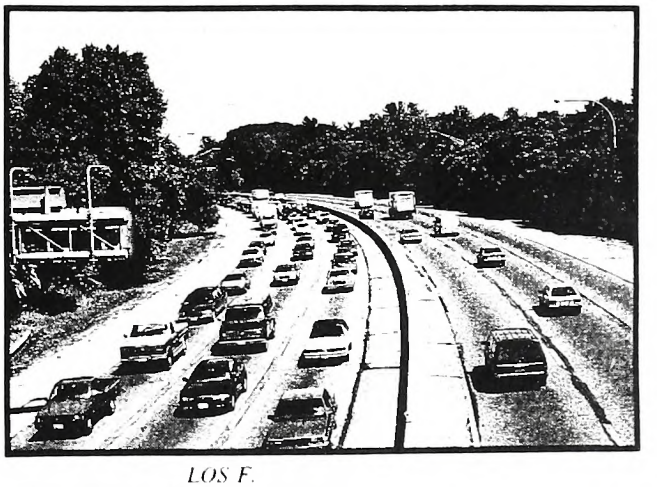
LOS B.



LOS E.



LOS C.



LOS F.

FIGURE 5

LEVELS OF SERVICE

2000 Traffic Capacity Analysis

The roadways in the Washington County area were analyzed for existing capacity deficiencies. Based upon the traffic counts compiled for the year 2000, all roadways are currently operating well below capacity. However, peak periods, such as morning and afternoon peak hours or summer tourist peaks, may result in capacity deficiencies, particularly along US 64.

2025 Traffic Capacity Analysis

The capacity deficiency analysis for the 2025 design year is based upon the "no build" alternative. This analysis examined the existing street system and determined that all of the existing facilities will be operating at acceptable levels in the design year. As in the 2000 analysis, peak periods, such as morning and afternoon peak hours or summer tourist peaks, may result in capacity deficiencies, particularly along US 64.

Bridge Conditions

Bridges are an important element of a highway system. Any bridge deficiency will affect the efficiency of the entire transportation system. In addition, bridges present the greatest opportunity of all potential highway failures for disruption of community welfare and loss of life. Therefore, bridges must be constructed to the same, or higher, design standards as the system of which they are a part, and must be inspected regularly to ensure the safety of the traveling public.

The NCDOT Bridge Maintenance Unit inspects all bridges in North Carolina at least once every two years. A sufficiency rating ranging from 0 to 100 for each bridge is calculated and establishes the eligibility and priority for replacement. Bridges having the highest priority are replaced as Federal and State funds become available.

A bridge is considered deficient if it is either Structurally Deficient or Functionally Obsolete. A bridge is considered structurally deficient if it is in relatively poor condition or has insufficient load-carry capacity, due to either the original design or to deterioration. The bridge is considered to be functionally obsolete if it is narrow, has inadequate under-clearances, is poorly aligned with the roadway, and can no longer adequately serve existing traffic. A bridge must be classified as deficient in order to qualify for Federal replacement funds. Deficient bridges within the County are listed n in **Table 4.**

Table 4. Structurally Deficient & Functionally Obsolete Bridges Located within the Planning Area

Bridge Number	Location	Sufficiency Rating	Year Built	Remaining Life
9	Bridge on NC 45 over Conaby Creek	50.2	1967	18
14	Culvert on US 64 over swamp	49.6	1953	2
16	Culvert on US 64 over swamp	67.9	1957	8
87	Bridge on SR 1122 over Main Canal	63.5	1964	7

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VI. Environmental Concerns

In recent years, the environmental considerations associated with highway construction have come to the forefront of the planning process. Section 102 of the National Environmental Policy Act (NEPA) requires the completion of an Environmental Impact Statement (EIS) for projects that have a significant impact on the environment. The EIS includes impacts on wetlands, wildlife, water quality, historic properties and public lands. While this report does not cover the environmental concerns in as much detail as an EIS would, consideration for many of these factors was incorporated in the development of the Thoroughfare Plan.

Wetlands

Wetlands are those lands where saturation with water is the dominant factor in determining the nature of soil development and the types of plant and animal communities inhabiting the soil. Wetlands are crucial ecosystems in our environment; they help to regulate and maintain the hydrology of rivers, lakes, and streams by storing and slowly releasing floodwaters. Wetlands help maintain the quality of water by storing nutrients, reducing sediment loads, and reducing erosion. Wetlands are also critical to fish and wildlife populations, providing an important habitat for approximately one-third of the plant and animal species that are listed as threatened or endangered.

The impacts to wetland areas within Washington County were determined with the use of the National Wetlands Inventory Mapping provided by the U. S. Fish and Wildlife Service. The location of wetlands within the planning area is shown in **Figure 6**. Minimal impacts to wetlands and other water resources are expected to result from recommended improvements. However, this mapping is merely a best estimate of the approximate location of wetlands, based upon aerial photography rather than field data. Therefore, more extensive investigations will be required prior to the design of any recommended facilities.

Threatened and Endangered Species

The Threatened And Endangered Species Act of 1973 allows the U. S. Fish and Wildlife Service to impose measures on the Department of Transportation to mitigate the environmental impacts of a roadway project on endangered animal and plant species, as well as critical wildlife habitats. Locating any rare species that exist within the planning area during this early planning stage will help to avoid or minimize impacts.

A preliminary review of the Federally Listed Threatened and Endangered Species in Washington County was completed to determine what effects, if any, the recommended improvements may have on wildlife. Mapping from the N. C. Department of Environment and Natural Resources revealed occurrences of threatened or endangered plant and/or animal species, which are summarized in **Table 5**.

Table 5. Threatened or Endangered Species within the Planning Area				
Species	Common Name	Major Group	Status*	
			NC	*Federal*
Alligator mississippiensis	American Alligator	Reptile	T	T(S/A)
Anodonta implicata	Alewife Floater	Mollusk	SC	n/a
Canis rufus	Red Wolf	Mammal	SR	LEXN
Condylura cristata	Star-nosed mole	Mammal	SC	n/a
Corynorhinus rafinesquii	Rafinesque's big-eared bat	Mammal	SC	FSC
Fundulus waccamawensis	Waccamaw killifish	Fish	SC	FSC
Haliaeetus leucocephalus	Bald eagle	Bird	E	LT
Leptodea ochracea	Tidewater Mucket	Mollusk	SC	n/a
Ligumia nasuta	Eastern Pondmussel	Mollusk	SC	n/a
Lilawopsis carolinensis	Carolina Grasswort	Vascular plant	T	n/a

* See **Appendix D** for definitions of status.

Historic Sites

Section 106 of the National Historic Preservation Act requires the Department of Transportation to identify historic properties listed in, as well as eligible for, the National Register of Historic Places (NRHP). The NCDOT must consider the impacts of road projects on these properties and consult with the Federal Advisory Council on Historic Preservation.

N. C. General Statute 121-12(a) requires the NCDOT to identify historic properties listed on the National Register, but not necessarily those eligible to be listed. The NCDOT must consider the impacts and consult with the N. C. Historical Commission, but is not bound by their recommendations.

The location of historic sites within Washington County was investigated to determine any possible impacts resulting from the recommended improvements. This investigation identified two properties listed on the NRHP, the Rehobeth Methodist Church and the Somerset Place State Historical Site. Rehobeth Methodist Church is located adjacent to US 64 just east of Pritchard Loop (SR 1317). The Somerset Place State Historical Site is located along Lake Shore Road (SR 1166) adjacent to Pettigrew State Park. No planned roadway improvements should conflict with either of these historic sites.

Archaeological Impacts

The location of recorded archaeological sites was researched to determine the possible impacts of proposed roadway projects. Based upon this initial investigation, no archaeological sites should be impacted by the recommended improvements. However, archaeological sites are often difficult to identify without actual field excavation. As a result, possible sites may not be identified during the initial planning process; therefore, each proposed project should be evaluated individually prior to construction.

Washington County
Wetlands & Water Resources

- Roadways
- Railroads
- Washington County
- Municipalities
- Major Bodies of Water
- Major Rivers & Streams
- National Wetland Inventory
- DCM Wetlands

Water Supply Watershed

- Critical
- Proposed
- High Quality Water Zones
- Hydrologic Units

1 0 1 2 Miles

Figure 6

Housing and Neighborhoods

The preservation of cohesive neighborhoods is a fundamental aspect of thoroughfare planning. When specific streets are designated as thoroughfares, heavy traffic is minimized on neighborhood streets, thereby minimizing negative impacts. In order to reduce heavy traffic on residential streets, it is imperative that new facilities are constructed and deficient facilities are improved.

Educational Facilities

The location of educational facilities in Washington County was considered during the development of the thoroughfare plan. No proposed facilities or improvements shall displace any school or other educational facility.

Environmental Justice

Environmental justice is define as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies."[2] An executive order signed by President Clinton in 1994 states that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."[3]

The following are the four classifications of minorities that are federally recognized:

- Black (having origins in any of the black racial groups or Africa);
- Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
- Asian American (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); and
- American Indian and Alaskan Native (having origins in any of the original people of North America and maintaining cultural identification through tribal affiliation or community recognition).

The dispersion of these minority populations in Washington County is presented in **Figure 7**.

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[2] United States Environmental Protection Agency. http://es.epa.gov/oeca/main/ej/index.html.

[3] *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.* February 11, 1994.

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Washington County
Minority Population Dispersion

Roadways
Railroads
Washington County
Municipalities
Major Bodies of Water
Major Rivers & Streams

Environmental Justice
- No Persons in Block
- Minority Population less than or equal to County Average
- Minority Population between the County Average and two time the County Average
- Minority Population between two times and three times the County Average
- Minority Population three times greater than County Average or Entire Block Comprised of Minority Population

1 0 1 2 Miles

Figure 7

VII. County Thoroughfare Planning Principles

Objectives

Thoroughfare planning can be quite advantageous for areas such as Washington County. The primary objective of a county thoroughfare plan is to ensure the development of the most appropriate roadway system to meet existing and future travel desires with the area. By developing a thoroughfare plan, provisions for roadway improvements can be incorporated into policy decisions, which will help to guarantee that feasible solutions will exist in the future when improvements are needed.

The County should derive two major benefits from county thoroughfare planning. First, each roadway can be designed to perform a specific function and to provide a specific level of service. This permits savings in right-of-way, construction and maintenance costs. In addition, this will help to protect residential neighborhoods and encourage stability in travel and land use patterns. Second, local officials are informed of future improvements and can incorporate them into planning and policy decisions. This will permit developers to design subdivisions in a non-conflicting manner, direct school and park officials to better locate their facilities, and minimize damage to property and community appearance that is sometimes associated with transportation improvements.

Concept

The purpose of county thoroughfare planning is to classify a functional system of roads that provide direct, efficient and safe travel. Different roadways in the County are designed to have specific functions and levels of service, thereby minimizing the conflicts between roadway capacity and land development. Ideally, a county should update its thoroughfare plan every ten years in order to account for emerging development patterns.

In a county thoroughfare plan, roadways are designated as either urban or rural. Local municipalities typically have planning jurisdiction over roadways within their planning area and the county assumes planning jurisdiction over those roadways outside of the urban planning areas. In those areas where no urban thoroughfare planning has occurred, roadways are generally designated as rural for the purpose of developing the county thoroughfare plan.

The county thoroughfare plan is based upon the rural functional classification system. This system is made up of principal arterial, minor arterial, collector roadway and local roadway facilities. These elements were defined in **Chapter II**.

APPENDICES

Appendix A
Typical Thoroughfare Cross-Sections

Cross section requirements for thoroughfares vary according to the desired capacity and level of service to be provided. Universal standards in the design of thoroughfare are not practical. Each street section must be individually analyzed and its cross section requirements determined on the basis of amount and type of projected traffic, existing capacity, desired level of service, and available right-of-way.

Typical cross section recommendations are shown in **Figure 8**. These cross sections are typical for facilities on new location, where right-of-way constraints are not critical. For widening projects and urban projects with limited right-of-way, special cross sections should be developed that meet the needs of the project.

Recommended typical cross sections for thoroughfares were derived on the basis of projected traffic, existing capacities, desirable levels, and available right-of-way and are tabulated in **Appendix E**.

Cross sections "A" and "L" are typical for controlled access freeways. The 46-foot grassed median is the minimum desirable median width, but may vary depending upon design considerations. Right-of-way requirements would typically vary upward from 228 feet, depending upon cut and fill requirements.

Cross section "B," seven lane curb and gutter, should not be used for new projects. When the conditions warrant six lanes, cross section "D" should be recommended. Cross section "B" should be used only in special situations such as when widening from a five lane section and right-of-way is limited. Even in these situations, consideration should be given to converting the center turn lane to a median so that cross section "D" is the final cross section.

Cross sections "C," five lane roadways, are typical for major thoroughfares where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

Cross sections "D," "E," and "M" are used on major thoroughfares where left turns and intersecting streets are not as frequent. Left turns would be restricted to a few selected intersections. The 16-foot median is the minimum recommended for an urban boulevard type cross section. In most instances, monolithic construction should be utilized due to greater cost effectiveness, ease and speed of placement, and reduced future maintenance requirements. In special cases, grassed or landscaped medians may be used in urban areas. However, these types of medians result in greatly increased maintenance personnel. Non-monolithic medians should only be recommended when the above concerns are addressed.

Cross section "F" is recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 24 feet is recommended with 30 feet being desirable.

Cross section "G" is recommended for major thoroughfares where projected travel indicates a need for four travel lanes but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would probably be required at major intersections. This cross section should be used only if the above criteria are met. If right-of-way is not restricted, future strip development could take place and the inner lanes could become de facto left turn lanes.

In urban environments, thoroughfares which have high volumes of left turning traffic and provide access to adjacent development typically require cross section "H." Cross sections "I" and "J" are usually recommended for urban minor thoroughfares since these facilities usually serve both land service and traffic service functions. Cross section "I" would be used on those minor thoroughfare where parking on both sides is needed as a result of more intense development.

Cross section "K" is used in rural areas or for staged construction of a wider multi-lane cross section. On some thoroughfares, projected traffic volumes may indicate that two travel lanes will adequately serve travel for a considerable period of time. For areas that are growing and future widening will be necessary, the full right-of-way of 100 feet should be required. In some instances, local ordinances may not allow the full 100 feet. In those cases, 70 feet should be preserved with the understanding that the full 100 feet will be preserved by use of building setbacks and future street line ordinances.

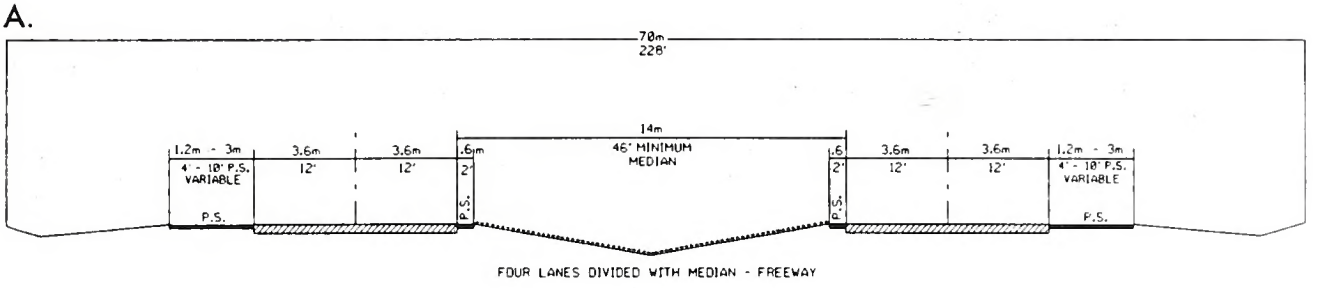
The urban curb and gutter cross sections all illustrate the sidewalk adjacent to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to provide additional separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

The rights-of-ways shown for the typical cross sections are the minimum rights-of-way required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may necessitate either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban thoroughfare construction.

If there is sufficient bicycle travel along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to contain the bicycle facilities. The North Carolina Bicycle Facilities Planning and Design Guidelines should be consulted for design standards for bicycle facilities. Cross sections "N," "O," and "P" are typically used to accommodate bicycle travel.

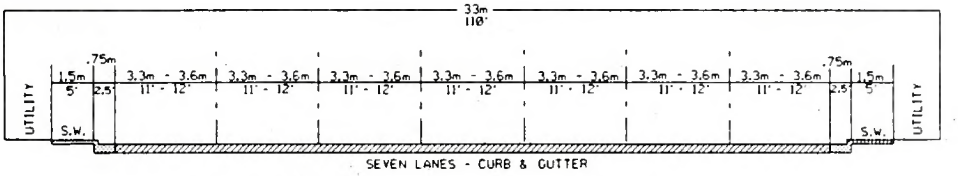
TYPICAL THOROUGHFARE CROSS SECTIONS

A.



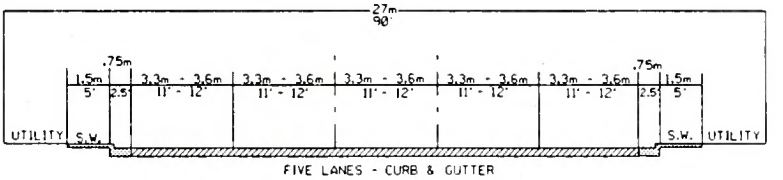
FOUR LANES DIVIDED WITH MEDIAN - FREEWAY

B.



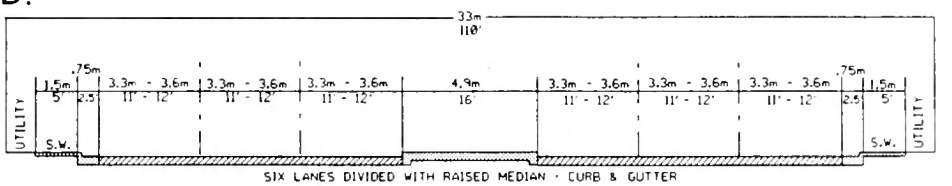
SEVEN LANES - CURB & GUTTER

C.



FIVE LANES - CURB & GUTTER

D.

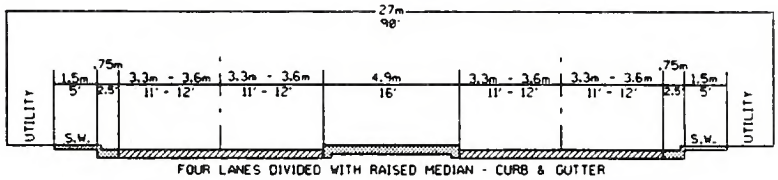


SIX LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

FIGURE 8

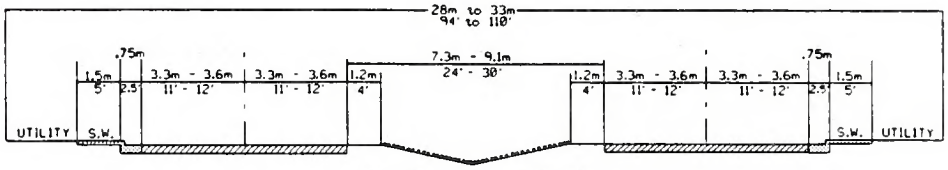
TYPICAL THOROUGHFARE CROSS SECTIONS

E.



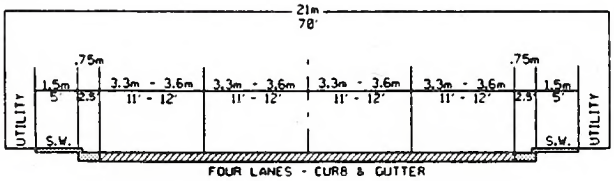
FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

F.



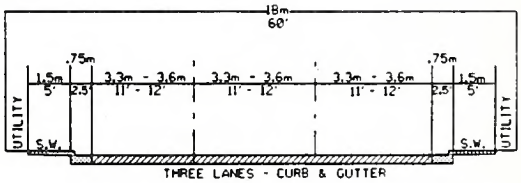
FOUR LANES DIVIDED - BOULEVARD
GRASS MEDIAN

G.



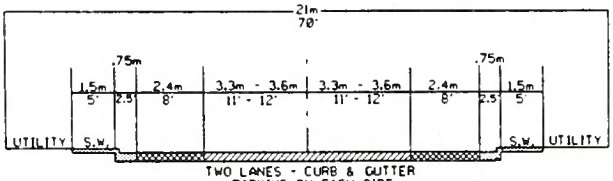
FOUR LANES - CURB & GUTTER

H.



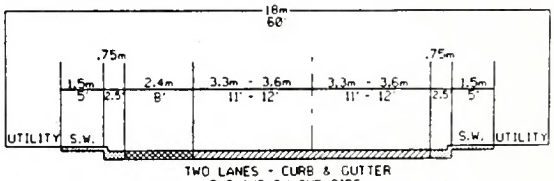
THREE LANES - CURB & GUTTER

I.



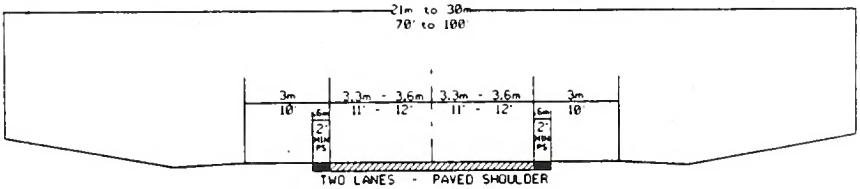
TWO LANES - CURB & GUTTER
PARKING ON EACH SIDE

J.



TWO LANES - CURB & GUTTER
PARKING ON ONE SIDE

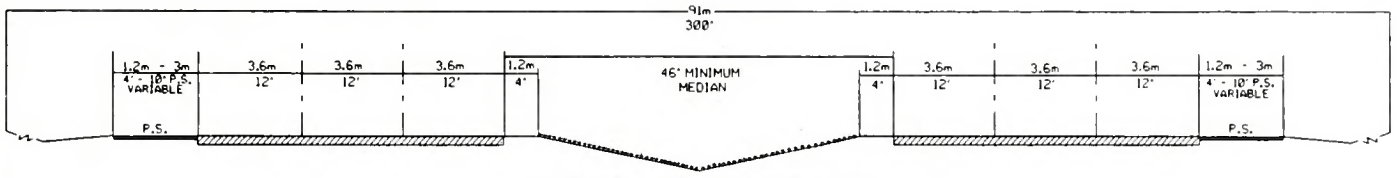
K.



TWO LANES - PAVED SHOULDER

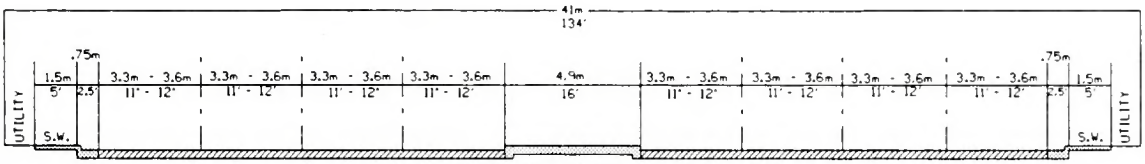
TYPICAL THOROUGHFARE CROSS SECTIONS

L.



SIX LANES DIVIDED WITH GRASS MEDIAN - FREEWAY

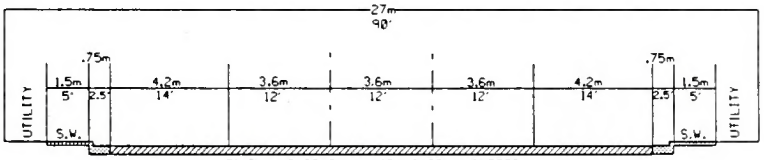
M.



EIGHT LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

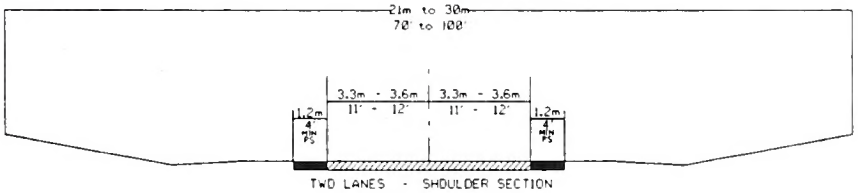
TYPICAL THOROUGHFARE CROSS SECTIONS FOR ACCOMMODATING BICYCLES

N.



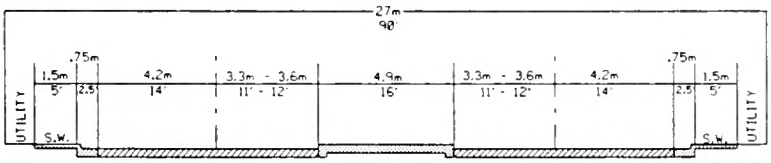
FIVE-LANE ROADWAY WITH CURB & GUTTER,
STANDARD INSIDE LANES & WIDENED CURB LANES

O.



TWO LANES - SHOULDER SECTION

P.



FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER,
STANDARD INSIDE LANES & WIDENED CURB LANES

Appendix B
Recommended Subdivision Ordinances

Definitions

I. Streets and Roads
   A. Rural Roads
      1. Principle Arterial: A rural link in a highway system serving travel, and having characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.
      2. Minor Arterial: A rural roadway joining cities and larger towns and providing intra-state and inter-county service at relatively high overall travel speeds with minimum interference to through movement.
      3. Major Collector: A road which serves major intra-county travel corridors and traffic generators and provides access to the Arterial system.
      4. Minor Collector: A road which provides service to small local communities and traffic generators and provides access to the Major Collector system.
      5. Local Road: A road which serves primarily to provide access to adjacent land, over relatively short distances.

   B. Urban Streets
      1. Major Thoroughfares: Major thoroughfares consist of Interstate, other freeway, expressway, or parkway roads, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.
      2. Minor Thoroughfares: Minor thoroughfares perform the function of collecting traffic from local access streets and carrying it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating minor through traffic movements and may also serve abutting property.
      3. Local Street: A local street is any street not on a higher order urban system and serves primarily to provide direct access to abutting land.

   C. Specific Type Rural or Urban Streets
      1. Freeway, expressway, or parkway: Divided multi-lane roadways designed to carry large volumes of traffic at high speeds. A freeway provides for continuous flow of vehicles with no direct access to abutting property and with access to selected crossroads only by way of interchanges. An expressway is a facility with full or partial control of access and generally with grade separations at major intersections. A parkway is for non-commercial traffic, with full or partial control of access.
      2. Residential Collector Street: A local street which serves as a connector street between local residential streets and the thoroughfare system.

Residential collector streets typically collect traffic from 100 to 400 dwelling units.

3. Local Residential Street: Cul-de-sacs, loop streets less than 2500 ft in length, or streets less than 1.0 miles in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.
4. Cul-de-sac: A short street having only one end open to traffic and the other end being permanently terminated and a vehicular turn-around provided.
5. Frontage Road: A road that is parallel to a partial of full access controlled facility and provides access to adjacent land.
6. Alley: A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

II. Property

A. Building Setback Line: A line parallel to the street in front of which no structure shall be erected.

B. Easement: A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.

C. Lot: A portion of a subdivision, or any other parcel of land, which is intended as a unit for transfer of ownership or for development, or both. The word "lot" includes the words "plat" and "parcel".

III. Subdivision

A. Subdivider: Any person, firm, corporation, or official agent thereof, who subdivides or develops any land deemed to be a subdivision.

B. Subdivision: All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, immediate or future, of sale or building development and all divisions of land involving the dedication of a new street or change in existing streets; provided, however, that the following shall not be included within this definition nor subject to these regulations: (1) the combination or re-combination of portions of previously platted lots where the total number of lots is not increases and the resultant lots are equal to or exceed the standards contained herein; (2) the division of land into parcels greater than 10 acres where not street right-of-way dedication is involved; (3) the public acquisition, by purchase, of strips of land for the widening or the opening of streets; (4) the division of a tract in single ownership whose entire area is no greater than 2 acres into not more than three lots, where not street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.

C. Dedication: A gift, by the owner, or his property to another party without any consideration being given for the transfer. The dedication is made by written instrument and is completed with an acceptance.

D. Reservation: Reservation of land does not involve any transfer of property rights. It constitutes an obligation to keep property free from development for a stated period of time.

Design Standards

I. Streets and Roads

The design of all roads within the Planning Area shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways, as taken or modified from the American Association of State Highway Officials' (AASHTO) manuals.

The provision of street rights-of-way shall conform and meet the recommendations of the Thoroughfare Plan, as adopted by the municipality.

The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally, the proposed streets should be the extension of existing streets, if possible.

A. Right-of-Way Widths: Right-of-way (ROW) widths shall not be less than the following and shall apply except in those cases where ROW requirements have been specifically set out in the Thoroughfare Plan.

1. Rural	Minimum ROW (feet)
a. Principal Arterial	
Freeways	350
Other	200
b. Minor Arterial	100
c. Major Collector	100
d. Minor Collector	80
e. Local Road	60

2. Urban	Minimum ROW (feet)
a. Major Thoroughfare other than Freeway/Expressway	90
b. Minor Thoroughfare	70
c. Local Street	60*
d. Cul-de-Sac	Variable**

* The desirable minimum right-of-way (ROW) is 60 feet. If curb and gutter is provided, 50 feet of ROW is adequate on local residential streets.

** The ROW dimension will depend on radius used for vehicular turn around. Distance form edge of pavement of turn around to ROW should not be less than distance form edge of pavement to ROW on street approaching turn around.

The subdivider will only be required to dedicate a maximum of 100 ft of right-of-way. In cases where over 100 ft of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 100 ft. In all cases in which right-of-way is sought for a fully controlled access facility, the subdivider will only be required to make a reservation. It is strongly recommended that subdivisions provide access to properties from internal streets, and that direct property access to major thoroughfares, principle and minor arterials, and major collectors be avoided. Direct property access to minor thoroughfares is also undesirable.

A partial width right-of-way, not less than 60 ft in width, may be dedicated when adjoining undeveloped property that is owned or controlled by the subdivider, provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is sub-divided, the remainder of the full required right-of-way shall be dedicated.

B. Street Widths: Widths for street and road classifications other than local shall be as recommended by the Thoroughfare Plan. Width of local roads and streets shall be as follows:
   1. Local Residential
      Curb and Gutter section: 26 ft, face to face of curb
      Shoulder section: 20 ft to edge of pavement, 4 ft for shoulders
   2. Residential Collector
      Curb and Gutter section: 34 ft, face to face of curb
      Shoulder section: 20 ft to edge of pavement, 6 ft for shoulders

C. Geometric Characteristics: The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System of Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under Right-of-Way shall apply.
   1. Design Speed: The design speed for a roadway should be a minimum of 5 mph greater than the posted speed limit. The design speeds for subdivision type streets shall be:

Table 6. Design Speeds			
Facility Type	Design Speed (km/h)		
	Desirable	Minimum	
		Level	Rolling
RURAL			
• Minor Collector Roads (ADT > 2000)	60	50	40
• Local Roads including Residential Collectors & Local Residential (ADT > 4000)	50	50*	40*
URBAN			
• Major Thoroughfare other than Freeways or Expressways	60	50	40
• Minor Thoroughfares	40	30	30
• Local Streets	30	30**	20**

* Based on ADT of 400-750. Where roads serve a limited area and small number of units, can reduce minimum design speed.

** Based on projected ADT of 50-250. (Reference NCDOT Roadway Design Manual page 1-1B)

2. Maximum and Minimum Grades

   a. The maximum grades in percent shall be:

Table 7. Maximum Vertical Grade (English)				
Facility Type	Design Speed (mph)	Maximum % Grade		
		Flat	Rolling	Mountainous
RURAL				
Minor Collector Roads*	20	7	10	12
	30	7	9	10
	40	7	8	10
	50	6	7	9
	60	5	6	8
	70	4	5	6
Local roads including Residential Collectors and Local Residential Streets*	20	--	11	16
	30	7	10	14
	40	7	9	12
	50	6	8	10
	60	5	6	--
URBAN				
Major Thoroughfares other than Freeways or Expressways	30	8	9	11
	40	7	8	10
	50	6	7	9
	60	5	6	8
Minor Thoroughfares*				
	20	9	12	14
	30	9	11	12
	40	9	10	12
	50	7	8	10
	60	6	7	9
	70	5	6	7
Local Streets*				
	20	--	11	16
	30	7	10	14
	40	7	9	12
	50	6	8	10
	60	5	6	--

* For streets and roads with projected annual average daily traffic less than 250 of short grades less than 150 meters (500 ft) long, grades may be 2% steeper than the values in the above table. (Reference NCDOT Roadway Metric Design Manual page 1-12 T-3).

b. Minimum grade should not be less than 0.5%.
c. Grades for 30 meters (100 feet) each way from intersections (measured from edge of pavement) should not exceed 5%.

3. Minimum Sight Distance: In the interest of public safety, no less than the minimum sight distance applicable shall be provided. Vertical curves that connect each change in grade shall be provided and calculated using the following parameters:

Table 8. Sight Distance

Design Speed (mph)	30	40	50	60
Stopping Sight Distance:				
Minimum (feet)	200	275	400	525
Desirable (feet)	200	325	475	650
Minimum K* Value for:				
Crest curve	30	60	110	190
Sag curve	40	60	90	120
Passing Sight Distance:				
Minimum Passing Distance for two lanes (feet)	1,100	1,500	1,800	2,100

(General practice call for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case.)
(Reference NCDOT Roadway Design Manual page 1-12 T-1)

* K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length of the vertical curve which will provide the desired sight distance. Sight distance provided for stopped vehicles at intersections should be in accordance with A Policy of Geometric Design of Highways and Streets, 1990.

4. The "Superelevation Table" shown below shows the minimum radius and the related maximum superelevation for design speeds. The maximum rate of roadway superelevations (e) for rural roads with no curb and gutter is 0.08. The maximum rate of superelevation for urban streets with curb and gutter is 0.06, with 0.04 being desirable.

Table 9. Superelevation Table

Design Speed (mph)	Maximum e*	Minimum Radius (ft)	Maximum Degree of Curve
30	0.04	302	19 00'
40	0.04	573	10 00'
50	0.04	955	6 00'
60	0.04	1,637	3 45'
30	0.06	273	21 00'
40	0.06	521	11 15'
50	0.06	955	6 45'
60	0.06	1,432	4 15'
30	0.08	260	22 45'
40	0.08	477	12 15'
50	0.08	819	7 30'
60	0.08	1,146	4 45'

* e = rate of roadway superelevation, foot per foot (Reference NCDOT Roadway Design Manual page 1-12 T-6 through T-8)

D. Intersections

1. Streets shall be laid out so as to intersection as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty-five degrees (65%).
2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersection streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.
3. Off-set intersections are to be avoided. Intersections which cannot be aligned should be separated by a minimum length of 200 feet between survey center lines.

E. Cul-de-Sacs

Cul-de-sacs shall not be more than 500 feet in length. The distance form the edge of pavement on the vehicular turn around to the right-of-way line should not be less than the distance form the edge of pavement to right-of-way line on the street approaching the turn around. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.

F. Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provisions are made for service access. Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.
2. The width of an alley shall be at least 20 feet.
3. Dead end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turn-around facilities at the dead end as may be required by the Planning Board.

G. Permits for Connection to State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any construction on the street or road. The application is available at the office of the District Engineer of the Division of Highways.

H. Offsets to Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 30 feet from the edge of pavement. On streets with curb and gutter, utility poles shall be set back a minimum distance of 6 feet from the face of curb.

I. Wheelchair Ramps

All street curbs being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason, shall provided wheelchair ramps for the physically handicapped at intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

J. Horizontal Width on Bridge Decks

1. The clear roadway widths for new and reconstructed bridges serving tow-lane, two-way traffic should be as follows:
   a. Shoulder section approach
      i. Design year ADT < 800: Minimum 28 ft width face to face of parapets, rails, or pavement width, plus 10 ft, whichever is greater.
      ii. Design year ADT between 800-2000: Minimum 34 ft width face to face of parapets, rails, or pavement width, plus 12 ft, whichever is greater.
      iii. Design year ADT > 2000: Minimum width of 40 ft, desirable width of 44 ft width face to face of parapets or rails.
   b. Curb and gutter approach
      i. Design year ADT < 800: Minimum 24 ft face to face of curbs.
      ii. Design year ADT > 800: Width of approach pavement measured face to face of curbs.

      Where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face of curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be a minimum of 1.5 ft, or greater if sidewalks are required.

2. The clear roadway widths for new and reconstructed bridges having four or more lanes serving undivided tow-way traffic should be as follows:
   a. Shoulder section approach: Width of approach pavement plus width of useable shoulders on the approach left and right. (Shoulder width 8 ft minimum, 10 ft desirable.)
   b. Curb and gutter approach: Width of approach pavement measured face to face of curbs.

Appendix C
Resources & Contacts

North Carolina Department of Transportation

Customer Service Office
1-877-DOT4YOU
(1-877-368-4968)

Secretary of Transportation
1501 Mail Service Center
Raleigh, NC 27699-1501
(919) 733-2520

Board of Transportation Member
Contact information for the current Board of Transportation Member may be accessed from the NCDOT homepage on the worldwide web *(http://www.dot.state.nc.us/board)* or by calling 1-877-DOT4YOU.

Highway Division 1

- **Division Engineer**
  Contact the Division Engineer with general questions concerning NCDOT activities within Division 1; information on Small Urban Funds.
  P.O. Box 850
  Edenton, NC 27932
  (252) 482-7977

- **Division Construction Engineer**
  Contact the Division Construction Engineer for information concerning major roadway improvements under construction.
  P.O. Box 850
  Edenton, NC 27932
  (252) 482-7977

- **Division Traffic Engineer**
  Contact the Division Traffic Engineer for information concerning high-collision locations.
  P.O. Box 850
  Edenton, NC 27932
  (252) 482-7977

- **District Engineer**
  Contact the District Engineer for information regarding Driveway Permits, Right of Way Encroachments, and Development Reviews.
  P.O. Box 928
  Plymouth, NC 27962
  (252) 793-4568

- **County Maintenance Engineer**
  Contact the County Maintenance Engineer regarding any maintenance activities, such as drainage.
  19204 US Hwy. 64 East
  Creswell, NC 27928
  (252) 797-4598

Centralized Personnel

- **Statewide Planning Branch**
  Contact the Statewide Planning Branch with long-range planning questions.
  1554 Mail Service Center
  Raleigh, NC 27699-1554
  (919) 733-4705

- **Secondary Roads Office**
  Contact the Secondary Roads Officer for information regarding the Industrial Access Funds Program.
  P.O. Box 25201
  Raleigh, NC 27699
  (919) 733-3520

- **Program Development Branch**
  Contact the Program Development Branch for information concerning Roadway Official Corridor Maps and the Transportation Improvement Program (TIP).
  1534 Mail Service Center
  Raleigh, NC 27699-1534
  (919) 733-2039

- **Project Development & Environmental Branch**
  Contact PDEA for information on environmental studies for projects that are included in the TIP.
  1548 Mail Service Center
  Raleigh, NC 27699-1548
  (919) 733-3141

- **Highway Design Branch**
  Contact the Highway Design Branch for information regarding alignments for projects that are included in the TIP.
  1584 Mail Service Center
  Raleigh, 27699-1584
  (919) 250-4001

- **Traffic Engineering & Safety Systems Branch**
  Contact the Traffic Engineering & Safety Systems Branch for information regarding Development Reviews.
  1561 Mail Service Center
  Raleigh, 27699-1561
  (919) 250-3915

- **Other departments**
  Contact information for other departments within the NCDOT not listed here are available at the NCDOT homepage on the worldwide web (http://www.dot.state.nc.us/board) or by calling 1-877-DOT4YOU.

Other State Government Offices

Division of Community Assistance

Contact the Division of Community Assistance for information regarding the Community Planning Program.

Washington Regional Office
P.O. Box 850
Washington, NC 27889
(252) 974-1308
http://www.dca.commerce.state.nc.us

Appendix D

Definitions of Environmental Status Codes: North Carolina Natural Heritage Program[1]

North Carolina Status[2]		Description
E	**Endangered**	"Any species or higher taxon of plant whose continued existence as a viable component of the States flora is determined to be in jeopardy" (GS 19B 106: 202.12). (Endangered species may not be removed from the wild except when a permit is obtained for research, propagation, or rescue which will enhance the survival of the species).
T	**Threatened**	"Any resident species of plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (GS 19B 106: 202.12). (Regulations are the same as for Endangered Species).
SC	**Special Concern**	"Any species of plant in North Carolina which requires monitoring but which may be collected and sold under regulations adopted under the provisions of [the Plant Protection and Conservation Act]" (GS 19B 106:202.12). (Special Concern species that are not also listed as Endangered or Threatened may be collected from the wild and sold under specific regulations. Propagated material only of Special Concern species that are also listed as Endangered or Threatened may be traded or sold under specific regulations.)
C	**Candidate**	Species which are very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction (and sometimes also by direct exploitation or disease). These species are also either rare throughout their ranges (fewer than 100 populations total) or disjunct in North Carolina from a main range in a different part of the country or world. Also included are species which may have 20-50 populations in North Carolina, but fewer than 50 populations worldwide. These are species which have the preponderance of their distribution in North Carolina and whose fate depends largely on their conservation here. Also included are many species known to have once occurred in North Carolina but with no known extant occurrences in the state (historical or extirpated species); if these species are relocated in the state, they are likely to be listed as Endangered or Threatened. If present land use trends continue, candidate species are likely to merit listing as Endangered or Threatened.
SR	**Significantly Rare**	Species which are very rare in North Carolina, generally substantially reduced in numbers by habitat destruction (and sometimes also by direct

[1] The information on which this list is based comes from a variety of sources, including field surveys, museums, herbaria, scientific literature, and personal communications. This list, which was compiled on Novmber 21, 2000, is dynamic, with new records continually being added and old records being revised as new information is received. As a result, the enclosed list cannot be considered a definitive record of natural heritage elements present in a given county or quad and should not be used as a substitute for field surveys.

[2] Plant statuses are determined by the Plant Conservation Program (NC Department of Agriculture), the Natural Heritage Program (NC Department of Environment and Natural Resources), and the North Carolina Plant Protection and Conservation Act of 1979. Animal statuses are determined by the *publication Endangered Wildlife of North Carolina*, March 16, 1992, and the Nongame and Endangered Wildlife Program (NC Department of Environment and Natural Resources).

exploitation or disease). These species are generally more common somewhere else in their ranges, occurring in North Carolina peripherally to their main ranges, mostly in habitats which are unusual in North Carolina. Also included are some species with 20-100 populations in North Carolina, if they also have only 50-100 populations rangewide and are declining.

W Watch List	Any other species believed to be rare and of conservation concern in the state but warranting active monitoring at this time.
P Proposed	A species which has been formally proposed for listing as Endangered, Threatened, or Special Concern, but has not yet completed the legally mandated listing process.

Federal Status[3]	**Description**
LE Endangered	A taxon "which is in danger of extinction throughout all or a significant portion of its range" (Endangered Species Act, Section 3).
LT Threatened	A taxon "which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (Endangered Species Act, Section 3).
C Candidate	A taxon under consideration for which there is sufficient information to support listing. This category was formerly designated as a Candidate 1 (C1) species.
LEXN	Endangered, nonessential experimental population. The Endangered Species Act permits the reintroductions of endangered animals as "nonessential experimental" populations. Such populations, considered nonessential to the survival of the species, are managed with fewer restrictions than populations listed as endangered.
FSC	Federal "Species of Concern" (also called "Species at Risk"). Formerly defined as a taxon under consideration for which there is insufficient information to support listing; formerly designated as a Candidate 2 (C2) species. Currently, the US Fish and Wildlife Service does not recognize this as an official designation.
T(S/A)	Threatened due to Similarity of Appearance. The Endangered Species Act authorizes the treatment of a species (subspecies or population segment) as threatened even though it is not otherwise listed as threatened if: (a) the species so closely resembles in appearance a threatened species that enforcement personnel would have substantial difficulty in differentiating between the listed and unlisted species; (b) the effect of this substantial difficulty is an additional threat to a threatened species; and (c) such treatment of an unlisted species will substantially facilitate the enforcement and further the policy of the Act. The American Alligator has this designation due to similarity of appearance to other rare crocodilians.
PE Proposed	Species has been proposed for listing as endangered.

[3] These statuses are designated by the US Fish and Wildlife Service. Federally listed Endangered and Threatened species are protected under the provisions of the Endangered Species Act of 1973, as amended through the 100th Congress. Unless otherwise noted, definitions are taken from the Federal Register, Vol. 56, No. 225, November 21, 1991 (50 CFR Part 17).

Appendix E

Thoroughfare Plan Street Tabulations & Recommendations

Facility & Segment				EXISTING SYSTEM					PROPOSED SYSTEM			
From	To	Speed (mph)	Distance (mi)	Cross-Section (ft)	lanes	ROW (ft)	Capacity (vpd)	AADT (vpd)	Capacity (vpd)	AADT (vpd)	Cross-Section	ROW (ft)
Fourth Street (SR 1155)												
Main Street (SR 1142)	SCL Creswell	35	0.15	18	2	N/A	7500	1600	7500	2500	ADQ	ADQ
SCL Creswell	Newland Road (SR 1126)	55	2.40	18	2	N/A	9500	1400	9500	2800	ADQ	ADQ
Front Street (SR 1301)												
NC 308	NCL Roper	55	2.70	19	2	N/A	9500	500	9500	900	ADQ	ADQ
NCL Roper	US 64	35	0.70	22	2	N/A	10500	1400	10500	2900	ADQ	ADQ
Long Ridge Road (SR 1100)												
Beaufort County	Jordan Thick Road (SR 1103)	55	4.70	20	2	N/A	11500	800	11500	1500	ADQ	ADQ
Jordan Thick Road (SR 1103)	3.60 miles north	55	3.60	16	2	N/A	8500	700	8500	1200	ADQ	ADQ
3.60 miles north	Morratuck Road (SR 1106)	55	0.70	18	2	N/A	9500	2000	9500	2300	ADQ	ADQ
Main Street (SR 1142)												
Sixth Street (SR 1310)	Fourth Street (SR 1155)	35	0.17	53	2	N/A	12000	1700	12000	3600	ADQ	ADQ
NC 308												
US 64	Front Street (SR 1301)	55	2.50	20	2	100.0	11500	1500	11500	2000	ADQ	ADQ
Front Street (SR 1301)	Freeman Road (SR 1329)	55	2.90	20	2	100.0	11500	1900	11500	2000	ADQ	ADQ
Freeman Road (SR 1329)	NC 45	55	1.77	20	2	100	11500	2600	11500	4600	ADQ	ADQ
NC 32												
Chowan County	Bridge	55	2.00	22	2	120.0	12500	3700	12500	7800	ADQ	ADQ
Bridge	US 64	55	2.25	20	2	120.0	11500	4400	11500	6300	ADQ	ADQ
NC 45-99	Beaufort County	55	6.74	20	2	60.0	11500	2300	11500	3300	ADQ	ADQ
NC 32 Extension												
NC 32	US 64 Bypass	55	3.30	24	2	---	---	---	13500	5900	L	100.0
NC 32-45												
SPAB Plymouth	NC 45-99	55	2.10	20	2	60.0	11500	3500	11500	4400	ADQ	ADQ
NC 45-308												
NC 308	Bertie County	55	1.86	24	2	100.0	13500	2300	13500	4300	ADQ	ADQ
NC 45-99												
NC 32	Paul Road (SR 1127)	55	6.80	20	2	60.0	11500	1600	11500	2700	ADQ	ADQ
Paul Road (SR 1127)	Beaufort County	55	0.96	20	2	60.0	11500	2000	11500	3000	ADQ	ADQ
Newland Road (SR 1126)												
US 64	Keep Road (SR 1183)	55	6.80	20	2	60.0	11500	1100	11500	2200	ADQ	ADQ
Keep Road (SR 1183)	Western Road (SR 1164)	55	5.00	20	2	60.0	11500	700	11500	1400	ADQ	ADQ
Western Road (SR 1164)	Fourth Street (SR 1155)	55	0.70	20	2	N/A	11500	700	11500	1400	ADQ	ADQ

Facility & Segment				EXISTING SYSTEM					PROPOSED SYSTEM			
From	To	Speed (mph)	Distance (mi)	Cross-Section (ft)	lanes	ROW (ft)	Capacity (vpd)	AADT (vpd)	Capacity (vpd)	AADT (vpd)	Cross-Section	ROW (ft)
Old US 64 (SR 1122)												
US 64	WCL Roper	35	0.10	22	2	N/A	10500	500	10500	1000	ADQ	ADQ
WCL Roper	Front Street (SR 1301)	35	0.22	16	2	N/A	7500	1550	7500	3200	ADQ	ADQ
Front Street (SR 1301)	Railroad Street (SR 1175)	35	0.39	24	2	N/A	12000	1250	12000	2300	ADQ	ADQ
Railroad Street (SR 1175)	Deep Creek	35	0.06	16	2	N/A	7500	1250	7500	2300	ADQ	ADQ
Deep Creek	US 64	55	0.40	22	2	N/A	12500	400	12500	800	ADQ	ADQ
Sixth Street (SR 1310)												
Main Street (SR 1142)	US 64	35	0.30	30	2	N/A	12000	1100	12000	2000	ADQ	ADQ
US 64												
NC 45	Freeman Road (SR 1329)	55	1.70	23	2	60.0	13000	9200	13000	4700	ADQ	ADQ
Freeman Road (SR 1329)	Front Street (SR 1301)	55	2.59	23	2	60.0	13000	4500	13000	4100	ADQ	ADQ
Front Street (SR 1301)	Old US 64 (SR 1122)	55	0.77	23	2	60.0	13000	6200	13000	3300	ADQ	ADQ
Old US 64 (SR 1122)	NC 308	55	3.50	23	2	60.0	13000	5900	13000	3400	ADQ	ADQ
NC 308	Beasley Road (SR 1139)	55	2.80	23	2	60.0	13000	5600	13000	3300	ADQ	ADQ
Beasley Road (SR 1139)	NC 32	55	2.10	23	2	60.0	13000	7600	13000	4200	ADQ	ADQ
NC 32	Mile Wretch Road (SR 1304)	55	4.80	23	2	60.0	13000	5200	13000	2400	ADQ	ADQ
Mile Wretch Road (SR 1304)	Tyrell County	55	4.75	23	2	60.0	13000	6600	13000	4500	ADQ	ADQ
US 64 Bypass												
NC 45	Newland Road (SR 1126)	55	4.50	94	4	---	---	---	50000	15300	F	330.0
Newland Road (SR 1126)	NC 32 Extension	55	3.20	94	4	---	---	---	50000	14700	F	330.0
NC 32 Extension	Tyrell County	55	8.00	94	4	---	---	---	50000	11600	F	200.0

Appendix F
Local Government & Public Participation

The local staff, government, and citizens of Washington County were actively involved in the development of the 2000 Thoroughfare Plan. Several meetings with local staff and presentations to local citizens conducted throughout the course of the study insured that the Thoroughfare Plan would meet the needs and desires of Plymouth.

Meetings and Presentations

August 20, 1998	Initial meeting with County Manager to discuss the thoroughfare plan.
May 20, 1999	Open meeting with the Washington County Planning Board to present an overview of the thoroughfare planning process.
September 29, 1999	Meeting with County Manager to discuss development of thoroughfare plan, population & employment projections, and anticipated land use development.
August 7, 2000	Joint Public Informational Workshop with the Town of Plymouth.
November 16, 2000	Presentation of Recommended Thoroughfare Plan to the Washington County Planning Board.
September 11, 2000	Presentation of Recommended Thoroughfare Plan to County Commissioners.
March 5, 2001	Adoption of Recommended Thoroughfare Plan by the County Commissioners.

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